NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ALLEY CROPPING

(Acre)
Code 311

DEFINITION

Trees or shrubs planted in a set or series of single or multiple rows with agronomic, horticultural crops or forages produced in the alleys between the rows of woody plants.

PURPOSES

- Produce tree and/or shrub products (wood, nuts, berries, fodder, mulch, etc.) along with crops or forages.
- Improve crop or forage quality and quantity by enhancing microclimatic conditions.
- Reduce surface water runoff and erosion.
- Improve utilization and recycling of soil nutrients.
- Reduce subsurface water quantity or alter water table depths.
- Provide or enhance wildlife habitat.
- Create habitat for biological pest management.
- Improve crop diversity, quantity, quality and economic returns.
- Decrease movement offsite of nutrients or chemicals.
- Enhance the aesthetics of the area.
- Increase net carbon storage in the vegetation and soil.

CONDITIONS WHERE PRACTICE APPLIES

On all lands where trees, shrubs, crops and/or forages can be grown in combination.

CRITERIA

General Criteria Applicable to All Purposes

Plant Selection

- Combinations of crops or forages and woody plants shall be compatible and complementary, and provide the products and crops that meet landowner objectives.
- Plants shall be adapted to the climatic region and the soil resource, marketable, and suited to the landowner's equipment and management capabilities. For species selection, see table Conservation Plants and Their Uses (USDA-NRCS, P.R. & USVI), filed in Section II of the FOTG.
- Crop or forage sequence and woody species selection shall be determined using an acceptable nutrient balance procedure. Select crops, forages and woody plants that maximize the utilization and recycling of soil nutrients, animal wastes and plant residues and that maintain soil organic matter content.
- Moisture conservation or supplemental watering shall be provided for plant establishment and growth where natural precipitation is too low for the selected species.
- For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.
- Crops or forages and woody plants shall be selected for rooting depths and water requirements not to exceed available soil water.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service

- Select pest resistant plant varieties.
- Avoid selecting tree or shrub species, which provide habitat to pests of the accompanying crop or forage.

Design

The distance between the sets of trees or shrubs will be determined by the following tree or shrub management objectives:

- Light requirements and growth period of the crops or forages in the alleys.
- Erosion control needs.
- Machinery widths and turning areas.

Crops (woody and herbaceous) shall be grown in a planned conservation management system.

Soil erosion will be controlled by vegetative or other means until the alley cropping design is fully functional.

Avoid planting trees or shrubs where they will interfere with structures and above or below ground utilities.

Planting dates, care in handling, and planting the seed, seedlings, or cuttings will be accomplished to assure acceptable plant survival.

Only viable and high quality planting stock or seed will be used for establishing the tree or shrub rows.

Site preparation shall be sufficient for establishment and growth of selected species and appropriate for the site.

Comply with applicable federal, state and local laws and regulations, during the installation, operation (including product harvesting), and maintenance of this practice.

Additional Criteria to Reduce Surface Water Runoff and Erosion

Tree or shrub rows will be oriented on or near the contour to reduce water erosion.

To reduce surface water runoff and erosion, herbaceous ground cover will be established in conjunction with the tree or shrub rows.

To reduce wind erosion, tree or shrub rows will be oriented as close as possible perpendicular to erosive winds.

Selected species of trees and shrubs will be relatively deep rooted to encourage infiltration.

CONSIDERATIONS

Select crop, forage, tree and/or shrub varieties based on their tolerance to agriculture chemicals that will be used at the site.

Species diversity including use of native species should be considered to avoid loss of function due to species-specific pests or enhance wildlife needs.

High value trees or shrubs should be selected to maximize economic returns.

Consider cultural resources when planning this practice.

Anticipate possible off-site effects and modify the practice design accordingly.

Coppice ability of selected species of trees and shrubs should be considered when they are to be pruned periodically.

PLANS AND SPECIFICATIONS

Plans and Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

The trees, shrubs, crops, and/or forages will be inspected periodically and protected from adverse impacts including insects, diseases or competing vegetation. The trees or shrubs will also be protected from fire and damage from livestock or wildlife.

All other specified maintenance measures and techniques of tree/shrub establishment will continue until plant survival and establishment are assured. This includes replacement of dead and dying trees or shrubs, pruning of dead or damaged branches for safety reasons, periodic pruning of selected branches for control of product quality, and control of undesirable competing vegetation.

Any removals of tree or shrub products, use of agricultural chemicals, and maintenance

operations shall be consistent with the intended purpose of the practice. Avoid damaging the site and soil and comply with applicable federal, state and local regulations pertaining to on-site and off-site effects.

Table1. Example of Tree/Companion Crops [1]

Tree Species (Common Name)	Technical Name	Companion Crop(s)
Citrus		Plantain and Yautía
Cocconut		Buffelgrass Angletongrass
Granadillo, Mango		Cut flowers
Malagueta, Bay rum		Aloe; Buffelgrass
Mata Raton, Quick Stick	*Gliricidia sepium*	Coffee; Coffee and Yautia; Coffee and Casava; Coffee, Citrus and Yautía.
Teca, Teack	*Tectona grandis*	Yautía; Malanga
Teca, Teak	*Tectona grandis*	Stargrass

[1] More than one tree species is preferred to provide diversity.